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Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

Vol. 236. 93rd Year. LONDON, NOVEMBER 26, 1941. Registered as a Newspaper No. 4097. Price 1/-

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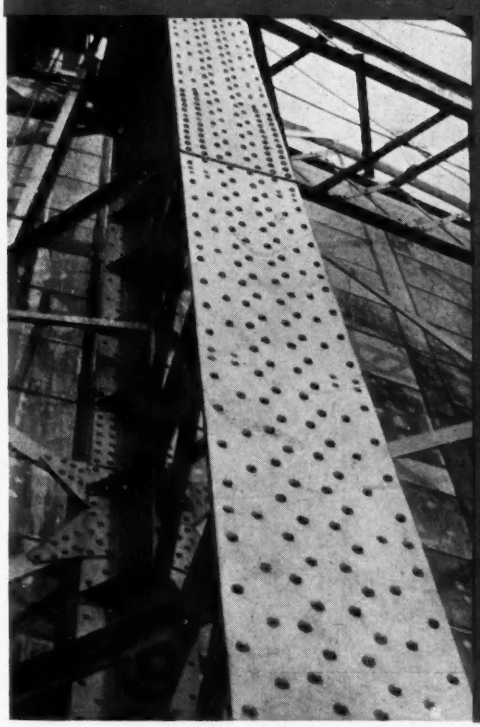

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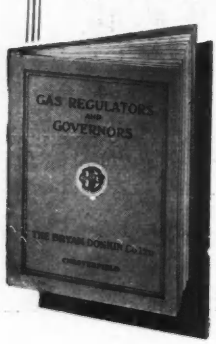

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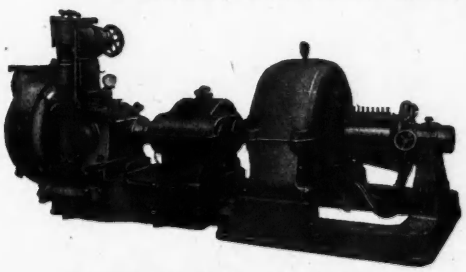

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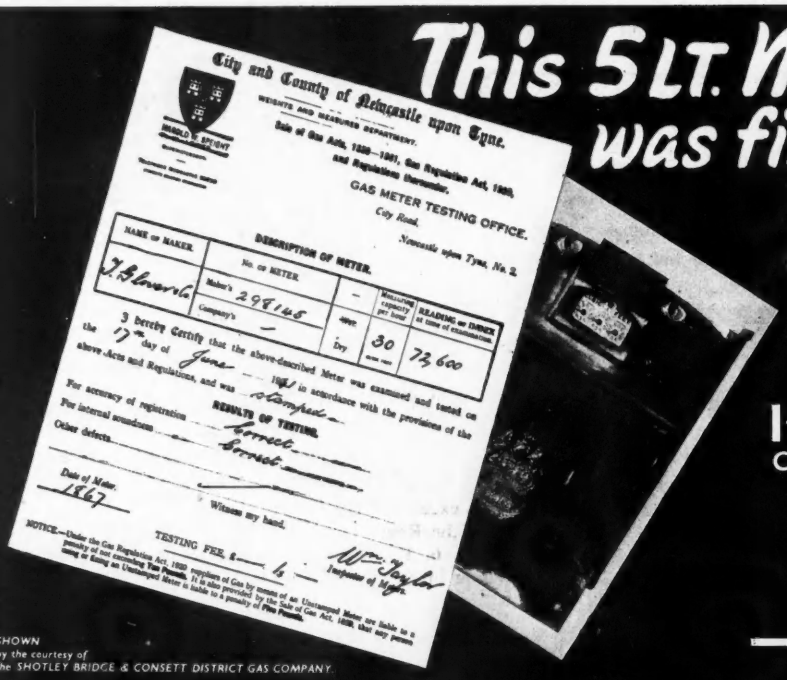
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NAME OF MAKER. DESCRIPTION OF METER. No. OF METER. Maker's 298106 Company's — Wet — Dry MAXIMUM capacity per hour 30 cub. ft. READING OR NUMBER at time of examination 73,600
I hereby Certify that the above-described Meter was examined and tested on the 17th day of June 1941 in accordance with the provisions of the above Acts and Regulations, and was Stamped
RESULTS OF TESTING.
For accuracy of registration Correct
For internal soundness Correct
Other defects —
Date of Meter 1867
Witness my hand.
TESTING FEE, 6 — 4 —
Inspector of Meters.
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GAS JOURNAL, NOV. 26, 1941

VOL. 236 93rd YEAR No. 4097

EDITORIAL NOTES

BUILDING OR CONSTRUCTIONAL OPERATIONS

A VALUED correspondent of the "JOURNAL" has suggested that a note with regard to building or constructional operations might be of value to many of our readers who may have experienced some difficulty in understanding the various Regulations dealing with the matter. Until Jan. 1 next the question is regulated by Regulation 56A Defence of the Realm Regulations S.R. & O., 1940, No. 1678, as amended by S.R. & O., 1941, No. 437. The Regulation defines the term "building or constructional operation" as the construction, reconstruction, or structural alteration of a building, of works of a kind required for the purpose of a public utility undertaking, or of any other fixed works of construction or civil engineering, including a road. It is clear that this definition embraces not only constructional work on the structure of the gas-works, but also work connected with fixed plant such as the re-setting of retorts. In other words, any operation for the carrying on of a gas undertaking is included. Undertakings are not, of course, concerned with constructional operations carried out on the consumer's side of the meter, for in such cases it is for the consumer to obtain the necessary authorization if the cost of the work is such as to render this authorization necessary.

With regard, therefore, to work in the gas-works or on the distribution system it has been necessary since Oct. 7, 1940, to obtain an authorization from the Board of Trade if it seemed likely that the cost of the work would exceed £500. From April 14, 1941, this sum has been reduced to £100. Obviously it is impossible to compute in every case the exact amount which any particular work may involve, but it will be necessary to obtain an authorization if, immediately before the commencement of the work, there were reasonable grounds for believing that these sums would be exceeded.

Certain building or constructional operations are exempt from the application of the Regulations, and therefore it is not necessary to obtain any authorization in respect of such work. These exemptions are as follows: (1) Operations undertaken on behalf of or in pursuance of a contract with the Government; (2) operations, the cost of which, or any part of the cost of which, a Government Department has agreed to defray; (3) operations undertaken by a local authority for the purpose of the discharge of functions under the Civil Defences Acts; (4) operations commenced before Oct. 7, 1940, for the carrying on of a gas undertaking ; (5) operations consisting of reconstruction undertaken for the purposes of a gas undertaking provided they are urgently necessary for that purpose and were done in circumstances of emergency which render it impracticable to obtain authorization.

It is to be pointed out that where a constructional or building operation is to be carried out after April 7, 1941, this and other operations undertaken within the twelve months preceding that date must be included in the computation of the cost.

Failure to obtain the necessary authorization is to be regarded as relieving a person from statutory obligation to carry out the work provided the failure to do so was due to the inability to obtain the necessary authorization. Representatives of the Board of Trade are empowered to enter premises or to call for information for the purpose of ascertaining whether any conditions which may have been attached to any authorization are being carried out.

After Jan. 1, 1942, the former Regulations will be repealed and Regulation 56A contained in S.R. & O. No. 1596 will be substituted. The new Regulation is substantially the same, in so far as it applies to gas undertakings, as those which are repealed, except that after Jan. 1 next the cost, which must not without the due authorization of the Board of Trade be exceeded, is to be prescribed by the Minister of Works and Buildings. The new Regulation is a typical piece of "legislation by reference," and it is exceedingly difficult to set out clearly in a sentence the effect of the Regulation. Briefly the following works, if begun after Oct. 6, 1940, for the purpose of a gas undertaking and exceeding in cost £100 if commenced before Jan. 1 or the prescribed amount if commended after that date will require the authorization of the Board of Trade: The construction, reconstruction, or alteration of a building, of works required for the purpose of providing water, light, heating or other services for a building, of works of a kind required for the purpose of a public utility undertaking, or of any other fixed works of construction or civil engineering.

The Regulation is applicable to Scotland and Northern Ireland and contains the necessary adaptations to the requirements of these countries.

It is clear, therefore, that every gas undertaking which has placed orders or contracts of considerable value since Oct. 6, 1940, or which proposes to do so in future, must obtain from the Board of Trade a licence authorizing the execution of the order, and every contractor must ascertain that such a licence has been obtained before he proceeds with the work. Under paragraph 6 of the Regulation, "If any operation is executed or work is carried out in contravention of any of the first three paragraphs of this Regulation the person at whose expense the operation is executed or the work is executed and—the person undertaking the execution of the operation or the carrying out of the work—shall be guilty of an offence against this Regulation."

ASSESSMENT OF PRIORITIES

WE have no special guidance as to whether or not such matters will come under direct surveillance of the Director of Gas Supply, but it is certain that they are becoming of increasing importance and presenting serious problems to the contracting side of the Industry. They demand individual and expert, rather than routine, handling. Whether for reasons of increased demand on gas undertakings or normal repair and maintenance work, we believe that many of the contractors at the present moment have embarrassingly full order books. Their relationship with the undertakings is still that of supplier and customer, and it is obviously difficult for them to have to decide the priority of execution of orders according to the national importance of the work, which to-day should be the principal, if not the only, criterion. It is, in fact, a responsibility which they should not be expected to carry. It would appear, however, that in the administration of the Regulation we have discussed above there is opportunity for the authorities to relate licences, and therefore presumably priorities, to manufacturing capacity, and to withhold licences altogether in cases where there is no genuine need for the work.

The latter is a case where expert knowledge will be of the greatest service in making the best use of our available resources and, purely incidentally, helping the contractors in a difficulty which some of them have already brought to our notice. Say, for example, a contractor receives an order for a considerable number of an improved type of accessory. Even if he well knows that the parts of the plant to be replaced are giving per-

fectly satisfactory service, and would continue to do so for many more years, it is not easy for him to point this out or to refuse the order point blank. Yet there is no scope for "luxury" replacements of this kind, and it is unlikely that they will be tolerated under the control which is exercisable in these days. Equally, we assume, the talent available to the Directorate will enable an expert examination to be made from every possible angle of any link-up schemes which may be suggested. Many of those already effected or in progress are, we know, excellent, and others have already proved their worth. On the other hand, we did hear of one for which elaborate plans were devised but which came to nothing owing to an almost last-minute discovery that, in certain eventualities which it was specially designed to meet, no gas at all would be available to flow through the connecting mains.

DISTRICTS MUST ACT

IF we are constantly discussing such matters as these, in which we think that the Directorate of Gas Supply will find more than enough scope for its activities, it must not be thought that we are affected with the "leave-it-to-Dr-Smith" complex. We have already warned the Industry what a dangerous attitude this would be. Unfortunately we have met it, in certain quarters, developed already to an unhealthy degree. It cannot be too strongly emphasized that the Director-General's appointment must not be regarded as a panacea for all the Industry's troubles. He himself has always held the view—and we know no reason why he should now have altered it—that the Industry will do far better to devise plans for its own reformation rather than have schemes not of its own devising thrust upon it. It is perfectly obvious that this still holds good, and that ideally the role of the Directorate would be to guide and to advise, and finally to gain acceptance in the general fuel scheme for such plans as the Industry shall have drawn up for its own salvation. Clearly the present is no time for any individual or any section of the Industry to shrug shoulders and cast responsibility to the winds with a sigh of relief. This is an attitude against which every possible precaution must be taken.

The present situation calls above all for the biggest drive the Gas Industry has ever made towards unanimity. By this we do not mean unanimity achieved merely by a vote of London committees. So thorough is the re-organization called for, and so great the need for it to receive unanimous approval in all its phases, that we feel the old suspicion of "London" must be eliminated once and for all. Final decisions for obvious reasons may eventually be most conveniently ratified in the capital, but let preliminary discussions be held in the districts, and let them be real discussions which will lead to a clear idea of what is most suited to each district. By all means let the central bodies put forward recommendations and generally guide the Industry as to the ends which are aimed at; this must clearly remain their function, and there is no other reasonable way of setting things going. But there must be no more of the old complaint—how can London know what is good for *us*?

We have never had entire sympathy with this very common grievance, because all the national bodies have been run, nominally at any rate, on democratic lines; and a debt of gratitude is owed to those—and they are comparatively few—who have borne the brunt of all the committee work. They have toiled hard in years gone by. The Provinces' choice of delegates has been limited only by the fact that not every suitable man could spare the time; it has, perhaps, very occasionally been influenced by the desire to keep somebody "quiet." But on the whole, if their influence in national affairs has been deficient, it must be principally because they were uncertain of their own minds, and so unable to brief their representatives sufficiently forcefully. The remedy, as we have said, is to have matters "out" thoroughly in every district, where local atmosphere is all-pervading and there is no suspicion of bias from quarters which may quite likely have other interests to watch. If this is done before final decisions are reached, there can be no further feeling that the true voice of the Industry has not been heard. But now is the time. To-day, not to-morrow, the whole Industry must be thinking and acting.

FEET ON THE GROUND

THE ideas which scientists and mathematicians have arrived at concerning friction are interesting, and we have spent many an idle hour pondering on what would be the state of affairs without this effect called "friction." It would, of course, be pointless to keep our feet on the ground any more than it would be useful to have our heads in the air. The lift of an aeroplane is due to friction (*i.e.*, resistance), and its speed of flight dependent on the magnitude of this resistance. It will be noted, however, that the aeroplane eventually comes to earth. It cannot remain *ad infinitum* in or above the clouds. After which simple thoughts we come to the point that the Gas Industry cannot afford to ignore the friction of current, known conditions. Unless there is profound revolutionary change for the better in gas-making procedure, signs of which from the economic point of view are yet lacking, prolonged flights in the air are likely to be followed by painful bumps to earth. We say this appreciating as fully as we can that without imagination, enthusiasm, and experiment, decay, not progress, will result.

It has been our privilege to attend several meetings recently of imaginative and enthusiastic workers in the Gas Industry, and we say without reserve that the discussions at these meetings —especially those at the meetings of so-called "junior" associations—have been the reverse of dispiriting. But we must confess to some feeling of anxiety concerning the views expressed by those who, to our minds, have their heads uplifted in the air but their feet also uplifted from the ground; the possible effects of friction appear to have been ignored by them—and we say this with no desire whatever to stagnate or to attempt to "stay put," which in any case would be in vain.

Obviously it is agreed that what is needed is an abundant supply of cheap gas which will in use give immaculate service. At the meetings to which we have referred the opinion has been voiced, with a dominant note of conviction, that complete gasification will prove—even could prove now, were it not for "vested interests," conservative thinking, lack of imagination, and so on—the one talisman to this end. We hope that complete gasification will be a wonder-maker, but we cannot agree with a basic argument in its favour, advanced time and again during the past year, that, but for that deadweight coke, gas would at once come into its own and occupy the place which was destined for it. Debates on post-war planning, of which there have been many of late, have in this respect, so it seems to us, provided happy hunting-grounds for wishful thinking. The term "post-war planning" appears in itself to cast some sort of magic spell. At times it strikes us that it acts as an anodyne.

The argument advanced is that coke should be regarded as a charge on gas manufacture, that coke is an incubus, that gas should be freed from the losses on coke. Gas, said a speaker at a recent "senior" meeting, is sold at, say, 10d. a therm, while coke fetches about 2d. a therm. Yet, he added, think of what is expended on maintenance and labour in producing coke, which has to be screened, and so on, and which in the end dictates policy. Our reply to this is simple: At what price could gas be sold if there was no revenue from coke? This is what makes us feel it desirable to keep our feet on the ground while looking ahead. Theoretically the idea of complete gasification has great appeal to us, and research on it must continue; but economically we find it impossible to regard coke under present conditions and likely conditions in the near future as an ogre defying the advancement of gas. In brief, we regard the "coke incubus" idea as fallacious and misleading in the circumstances of to-day.

FUEL FOR MOTOR TRANSPORT

IT will have been seen from an announcement published in last week's "JOURNAL" that the Secretary for Mines has invited the Committee which, under the Chairmanship of Lord Henley, considered low-temperature carbonization processes last year, to reassemble. We gave the constitution of the Committee, which we were glad to see included Mr. F. B. Richards, Chairman of the Woodall-Duckham Companies; and we think it will be agreed that its members are what may

be termed eminently "practical," combining commercial experience with business knowledge. The Committee has been asked to examine the sources of fuel for producer gas vehicles, to estimate the quantities which could be made available at present, and to report on the measures that would be required to increase the supplies if necessary. We assume that the problem necessarily involves the availability of producer gas plants themselves —*i.e.*, raw materials and labour—and consideration of what guarantees would be needed, from an economic aspect, to make a long-term policy, as distinct from immediate expediency, desirable or feasible.

We assume, too, that as far as the Gas Industry is concerned, it could, should it be thought desirable, make a valuable contribution towards availability of supply of suitable solid fuel for the purpose. The employment of activated coke for the purpose has been the subject of considerable study; and a notable contribution in this regard was given to The Institution of Gas Engineers in June, 1940, by Messrs. Thomas & Askey. These investigators showed that alkali-activated coke, properly graded, satisfied the specifications at the time of the Mining Association of Great Britain. The grading limits are, of course, fine, and have an important bearing on the economics of the manufacture of mobile gas producer fuel. At the same time the possible effects of such activation on the production of smokeless fuel for the domestic firegrate add to the attraction of the process. The main point at the moment would seem, however, to be that if the demand for the producer fuel is definitely established, and the whole proposition is shown in the circumstances to be necessary in the national interest, the Gas Industry would technically have no difficulty in fulfilling it. Other factors, such as availability of plant and adequate supplies of coal, would, of course, have to be satisfied.

PUBLIC UTILITY CONVERSIONS

LAST week the Chancellor of the Exchequer made the interesting and important announcement that, after consultation with the Capital Issues Committee, he was satisfied that it would be in the national interest to allow public utility undertakings to convert stock bearing interest at over 4% to stock bearing a lower rate. This is news which is welcome from a national point of view no less than from that of the Gas Industry.

From the national standpoint it indicates the soundness of our financial system. At the beginning of the war there was a complete embargo on the issue of any stock other than that connected with Government issues and conversions. It was imperative at that time that nothing should be allowed to restrict the field of the Government's own borrowing for war purposes. Some slight relaxation was granted when consent was given to conversions by county councils and municipalities, some of which had borrowed on short terms at high rates of interest. This relaxation was in conformity with the necessity to relieve ratepayers of high interest loans at a time when national taxation was rising to unprecedented levels.

The extension of this policy to all public utilities is good evidence of confidence on the part of the Government that the investing public will continue to appreciate the value of Government securities; notwithstanding the existence of what might, to a small extent, be regarded as a counter-attraction. The relaxation of the ban is also consistent with the declared policy of the Government to stabilize the price of such essential commodities as gas, electricity, and water to the utmost extent possible. At the same time it is essential to bear in mind that the action of the Government does not in itself confer a right to convert stock bearing high rates of interest. It merely implies that where, under the terms of issue, it is possible to redeem stock, consent will not be refused by the Treasury if the applicant is a public utility undertaking. In order to ascertain whether a conversion is possible, it will be necessary in each case to have regard to the terms of the prospectus under which the issues were originally made. The fact that the interest charges are high is not sufficient to permit a conversion, unless the stock can be converted under the terms of the prospectus. It may well be that the amount of stock which can be converted is not large, but there appears to be no reason why mortgages bearing interest rates in excess of 4% should not be paid off and re-issued at lower interest rates. Normally mortgages can be paid off on six months' notice. The same principle might apply to bonds of the various gas boards. Further, the relaxation applies only to public utility stock, which would include gas, electricity, water, and transport; it does not in any way affect the securities of ordinary commercial undertakings.

THE TITLE "JUNIORS"

NOW that planning and reconstruction in the Gas Industry are foremost topics of discussion and have already provided grounds for action of much import, would it not be well to consider the advisability of discontinuing the use of the term "Junior" in relation to gas associations? "Re-consider" is perhaps better, for in 1937 it was suggested that the title "Junior" should be dropped. The suggestion, advanced, we believe, by the London Juniors, went before the Joint Council of Junior Associations, and was passed on to The Institution of Gas Engineers. No change, however, was made either in the title or in the constitution of the Junior Associations, which to our mind was disappointing. We do not think there is anything whatever to be ashamed of in being a junior—far from it; and there must be juniors. But conditions have altered in the Gas Industry since the end of the last century, and especially since the last war there has been a gradual change in its personnel. Such has been the evolution that the term "Junior" applied to associations as they exist to-day seems to us to be archaic and unnecessary. When we regard the quality of the technical contributions presented at meetings of "Juniors," and the standard of the discussions, we fail to appreciate what good purpose is served by the word "Junior." We think the matter is of such importance as to merit serious attention at the present time. Doubtless there are technical difficulties, but these should not prove insurmountable if the question is firmly tackled. We would welcome views on the subject.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Personal

Mr. JAMES L. HYSLOP, Chief Assistant to the Engineer and Manager of Belfast Gas Undertaking, has been appointed Engineer and Manager in succession to Mr. J. D. Smith. A native of Ayr, Mr. Hyslop, who served in the last War, specialized in gas engineering, and in 1922 he gained first place in the United Kingdom in the final examination of the City and Guilds of London Institute. He was awarded the Silver Medal of the Institute and a special prize by the Society of British Gas Industries. In 1925 he was appointed technical assistant at the Belfast Gas-Works, and three years later he became Chief Assistant to the Engineer and Manager.

* * *

Mr. A. E. SYLVESTER, General Manager of the Gas Light and Coke Company, has been elected Chairman of the London Regional Gas Centre. The Centre was established to co-ordinate the Civil Defence arrangements of the seventeen Gas Companies operating in Greater London.

* * *

Alderman Sir ALBERT BALL was on Nov. 19 re-elected Chairman of Nottingham Corporation Gas Committee for the 35th year in succession. He has been a member of the Committee for 41 years.

Obituary

Wilfrid Wastell

The death occurred on Nov. 22 of Mr. WILFRID WASTELL, at the age of 70 years. It was in October of 1936 that Mr. Wastell retired from the General Managership of the South Suburban Gas Company, after being with the Company for 24 years.

Mr. Wastell's first post in the Gas Industry was at the Saltley Works

of the Birmingham Gas Department, and he later became Deputy Secretary to the Department. In 1912 he was appointed Secretary to the South Suburban Gas Company, and during his 24 years' service with the Company he witnessed and took a leading part in many important changes.

At the funeral, which took place on Monday last at Elmers End Cemetery, Mr. T. Brown (General Manager) represented the Chairman and Directors of the Company. A large number of former colleagues and representatives of contracting firms attended.

* * *

Mrs. POLLY GREEN, wife of Mr. J. Green, Engineer and Managing Director of the Wisbech Lighting Company, died at her home at Eastfield, Wisbech, on Nov. 17.

Letters to the Editor

Proposed Standard Calorific Value

SIR,—Much time and thought have been expended in the Editorial chair of the "JOURNAL" by yourself in recent weeks, and I fancy that late hours have sometimes been the rule, and some of them, perhaps, with head wrapped in the proverbial wet towel, in order to persuade those who have the direction of policy in gas manufacture that it would be fitting now, and is moreover urgent, to adopt a standard calorific value for town gas throughout the Industry.

Others, too, have not unnaturally contributed to your columns their views based on lifelong experience gained from the engineering, chemical, and financial side of the business. All these opinions must therefore be treated with consideration; and to them is due the respect that they merit, as being prompted by a genuine desire, common in our community, of providing the public with only the best possible value for money.

It is safe to assume that there is not one reader of your "JOURNAL" who is not aware of the high standard of intelligence, technical ability, and generosity of you and your staff in acting as guide, philosopher, and friend—for the payment of a few pence per week—in furthering the requirements of those always willing to learn by giving them a digest of all the Papers read before the representative bodies and other sources of literature within your command.

The value of an authoritative technical periodical to the executive and managerial side of an industry cannot be overstressed, and although this subject has recently received some publicity in high places, no apology is required from me in mentioning it again now.

Yourself and your correspondents are more qualified than myself to voice opinion on the supposed merits or otherwise of adopting a standard C.V. throughout the land; but—Why the necessity?

It is hardly a question analogous to "gauge" on the railways, for example. Future developments are not likely to embrace a "grid" of inter-connected gas mains spreading out all over the country comparable with the lines of communication provided by the railways, fed from a triangle of monster gas plants, vulnerable in times such as these and risky, to say the least, at other periods, owing to the possibility of damage by fire and other causes of anxiety connected with centralization.

Even if such a position ever arose, so much would of necessity have to be accomplished in other directions that it would appear that the C.V. question might well be left to posterity to re-arrange at a time when the whole system of gas-making would have to be revised. Of course, you are looking ahead and it is well to do so. We cannot stand still, and none of us desire to remain merely static.

At the moment there is a wide assortment of values in force, and some of them might be considered as extremes; but they are all justified by local conditions and divers practices and cannot be said to have happened by chance. In the case of adjoining works where there is an obvious necessity to link up and effect economy by closing down works thus made redundant, there will immediately arise an instance where values must agree at the time of amalgamation, but there is still no case for it in advance of that time.

Calorific value is intimately connected with the carrying capacity of the mains, and to lower the standard generally to, say, 450 would involve embarrassment in this direction alone. From the point of view last mentioned, it is economic in developing districts to send out the gas of as high a value as possible, instead of pulling it down.

In my own works at Southminster—truly a flea-bite in the whole group, but nevertheless typical—although small, no amount of persuasion would cause me to drop below the 500 mark, because that is most fitting there.

Then there is a very large block of 560 gas south of the Thames, now reduced to 530, for reasons too well known to mention here; and for these same reasons an argument is at once established in favour of variability and flexibility, more convincing than thousands of written words. The standard plan cannot come in, as there is no room for it.

Supposing for one moment that your suggestion had been an accomplished fact before the outbreak of hostilities; the whole structure would have collapsed owing to this emergency alone demanding an increase in the output of benzole, &c. Even in more normal times changes might arise necessitating alterations in value owing to the ebb and flow of demand for these products from the process of gas making. Changes in burners, such as happened when the mantle made its appearance—and who knows if an equally revolutionary invention will not be repeated?—additions to gas from outside sources, such as carburetted water gas, and endless other possibilities affecting the local working-up of the article of first importance that we have to offer for sale. Gas is distilled from coal, or "cracked," shall we say, and coal is provided by Nature, and subject to great variation in composition, and the transport of this has an important bearing on cost. Therefore is it logical to argue that the resulting product should be of universal standard?

One readily admits the elasticity of modern retorts—vertical or otherwise—in adapting themselves to the different coals with due regard to the ultimate quality of the output, but the proof of the pudding is in the eating, and if it were not for these fundamental differences in coals and the make-up of coal gas, then the standardization of C.V. would have automatically brought itself into existence.

Herbert Spencer wrote in his book on education that it is always best to leave the decision of right and wrong to Nature herself, as she would surely point out any faults her own way. I am now speaking from memory, so the exact wording of the quotation may not be correct, but if gas and its manufacturers are left to work out the value which is right having due regard to the fact that it is mainly dictated by natural coal, it is sure to be the best for any given conditions after more than a century and a quarter of production, and so much intensive research during the last fifty years.

Yours, &c.,

Southminster, Essex. R. V. E. DE B. CRAWSHAY.
Nov. 24, 1941.

[While appreciating the arguments advanced by Mr. Crawshay we would point out that at no time have we advocated one single universal calorific value for the whole country. We feel sure, however, that regional gas supply must and will come, and that regional standardization of calorific value must and will come, too, with interconnexion of mains. We have emphasized that calorific value is one factor only in the standardization of gas quality, while deprecating the confusing differences in declared calorific values which to our mind cannot be justified on grounds of "local circumstances and local market conditions."—ED., "G. J."]

Compulsory Benzole Extraction

SIR,—With reference to the last paragraph in your editorial of November 12 on compulsory benzole extraction, the difficulty that has held back the recovery of toluene from vertical retort crude benzole had been that no compensation for the much higher refining costs is allowed for in the price.

The toluene is certainly present in quite notable quantities, but those gas companies making pure toluene from vertical retort benzole, and those refiners handling similar benzole from smaller gas undertakings, may have the satisfaction of knowing they are acting patriotically, but that is about all. The more conscientiously the toluene is extracted the greater the financial loss at present.

Yours, &c.,

For the West Cumberland By-products Co., Ltd.,

Flimby, near Maryport. C. IRWIN,
Nov. 20, 1941. Managing Director.

New L.C.C.A. Executive Chairman

At a recent meeting of the Central Committee of the London and Counties Coke Association called to consider the Chairmanship of that Association, in view of Mr. R. W. Foot's appointment to the British Broadcasting Corporation, tribute was paid to Mr. Foot's unceasingly valuable work for the Association over a period of eleven years, and it was unanimously agreed that he should be asked to remain Chairman. He explained that his position with the B.B.C. was for wartime purposes only and would allow him to continue as Chairman and to be available for consultation if necessary, but that it would be impossible for him to be in executive control. Therefore, on a proposal by Mr. E. V. Evans and by a unanimous vote of the Central Committee, Colonel H. C. Smith was asked to act as Executive Chairman in the meantime, to which he consented. The intention is that Colonel Smith in this capacity shall be charged with full responsibility for conducting the affairs of the Association.

Colonel Smith has been connected with the Association from its inception and has been an active member of the Executive and Central Committees. It is of particular satisfaction to the Central Committee that Mr. Foot is able to remain connected with the Association in this way, and also that his place is to be taken temporarily by Colonel Smith, who not only has the confidence of the Producers and Distributors within the area, but also is so well known throughout the Industry.

Rotameter Flowmeters

A new folder dealing with precision flowmeters for all gases and liquids has been issued by the Rotameter Manufacturing Co., Ltd., Vale Road, Portslade. Made by British labour and of British materials throughout, the Rotameter consists fundamentally of only two parts, the metering tube and the indicator. It is not produced for stock with standard scale ranges, but is made to order to suit individual needs, so that the most suitable materials to meet special conditions may be utilized for the manufacture of the indicator and frame parts.

THE AIMS AND FUNCTIONS OF PUBLICITY

4. PRESTIGE ADVERTISING—ITS STRENGTH AND WEAKNESS

The fourth of a series of articles on various aspects of publicity specially contributed to the "Gas Journal" by the British Commercial Gas Association. Previous articles appeared in the "Journal" of Sept. 24, Oct. 15, and Nov. 12.

THE designer of advertisements who is not feeling at his best usually welcomes the suggestion that he should prepare a campaign to enhance the prestige or the goodwill attached to his client.

Prestige or goodwill advertisements are the easiest of all to prepare to the satisfaction of the sponsor, very often have no other effect at all, and are rarely exposed as being no good. On the other hand, there are highly successful advertisements of this kind, but they depart from the usual formula.

Goodwill and Badwill

The absence of goods to sell has cleared great spaces in the newspapers for non-selling advertisements, and advertisers seem resolved to fill them somehow. There is a theory abroad that especially when there are no goods it is important to keep brand names before the public. There is no real evidence for or against this, but it seems a bit thin. However, there is a rare outbreak of firms telling how fine they are, visions of the world of to-morrow, comparisons of business houses with battleships and the Royal Air Force (a high piece of vulgarity), much talk of abstract virtues like dependability and resolution. It would not take long to count the number of members of the general public who can remember any of them or identify one from the other. In passing, the eagerness with which some advertisers seized on the V for Victory symbol and showed that V stood for vulgarity as well deserves some notice. "V for Victory" over stomach acid was about the top or bottom along these lines. Successful business men often show a curious inability to view themselves through other than rose-coloured spectacles. They are so proud of their business that they expect other people to be delighted or impressed when they boast of it. Nothing could be more untrue. Some of the recent advertisements are in such appalling taste that they are known to have created bad will instead of good, and estranged customers instead of winning them. Others are neutral in result, as you might expect from pompous illustration, false sentiment, and banal prose.

One Virtue of Prestige Advertising

Prestige advertisements and goodwill advertisements belong to the same family although they can be roughly distinguished from each other. They both aim to put the reader in a frame of mind favourable to the advertiser without necessarily asking him to buy anything. Prestige advertising on the whole aims at exciting his admiration. It is not hard to produce staggering figures and magnificent drawings for a concern of any size. Dozens of competent artists can turn out superb works of art and at the present time at very reasonable prices. The public rarely takes much of it in and does not keep that much for long. Prestige advertising has, however, a certain virtue. It is a great tonic for the staff of the firm. It is not always realized how much of advertising is directed not at the outside public but at salesmen, shopkeepers, and so on. An enthusiastic staff is one of the greatest assets a firm can have. It does the members of an organization a lot of good to see it glorified in the Press. They read every word of the advertisements, and look on them with a completely different view to the public outside.

Prestige advertising has one special application for the Gas Industry. Engineers as a class are especially impressed by actual performance. A gas installation which is working gives physical proof that gas can do a certain job in a certain way. Undertakings which make new installations, or have successful installations working, can lend a great deal of power to the general advertising by sending the facts about them to the B.C.G.A. They can be used for the type of factual and scientific advertising which does not move laymen and laywomen much, but has great influence with technicians.

Successful goodwill advertising must go deeper than a facile assertion of virtues. Here is a case. Of all the goodwill campaigns published since the war started the one to do its job best hardly mentioned the advertiser at all. It was the series by Cadbury's on the theme, "Don't Blame the Shopkeeper." Briefly, it took several types of shopowner, described *them* in glowing terms, and pointed out how grieved they were at being unable to serve customers with their requirements. The only mention of Cadbury's was that they were publishing the series as a tribute to the Shopkeepers of England. The shopkeepers are delighted, Cadbury's have never been so loved by the trade, and a certain number of members of the public are favourably moved. More goodwill is aroused by saying "You are wonderful," than by saying "I am wonderful."

It is easy to do bad goodwill advertising and get away with it, but it is well worth looking past the obvious. In practice, selling advertisements contain a strong element of goodwill; they give an impression of the advertiser. Mr. Therm was a fortunate invention because he was light and cheerful and friendly, a fine corrective to the gloomy and official notion which is often held of gas undertakings.

RATIONAL WORKS RECONSTRUCTION

By "OMEGA"

The following examples are only typical of what ought to be aimed at in designing or partly reconstructing a gas-works. The object of the article is to direct attention to an important aspect of reconstruction work which is sometimes overlooked. The provision of means of obtaining measurements is often only possible at reconstruction times or when designing entirely new works. The advantages of such means are incalculable.

PARTIAL or complete reconstruction of a works offers a chance to remedy those things which experience has proved to be faulty in the original scheme of construction and/or operation. Chemical works in general, and gas-works in particular, are especially good examples of this.

The Gas Industry is a comparatively old one, but is one in which steady increase in output has continued. As a consequence, we find that there are many large gas-works which have attained their present size and layout by the process of addition to existing plant which has become too small to cope with new demands upon it. The resulting design is such as would never have been tolerated if a new works were to be built. Mains layout, for example, has often been the result of a compromise, on account of lack of remaining space on the site and the necessity for keeping the older mains working to their full capacity while the new ones were being installed. One of the principal defects of this method of building up a new works around the nucleus of the old is the difficulty (in many cases, the impossibility) of *measurement of those fundamental factors which influence quality, quantity, and cost of production.* Too often do we find that it is impossible to sectionize the works in such a fashion that one can know exactly what share of the total result is being borne by any particular unit. Unless knowledge of this kind is available, scientific control is impossible, and costs of production are bound to suffer. This applies not only to cases where specific troubles are being investigated, but also to normal working, where generally poor results may be due entirely or mainly to one particular, but unknown, unit.

The main causes of this difficulty in measurement are usually: (*a*) Layout of gas, water, liquor, and tar mains and pipes in such a way that there are common conduits for products from different sources, so that it is impossible to separate the streams; (*b*) lack of provision for separate storage of liquids such as water, liquor, and tar, and solids such as coal and coke.

The remedy lies in providing, as far as is practicable, alternative routes of flow, ample sectionizing valves, and duplicate storage vessels. Obviously this involves extra cost, and it is impossible to generalize as to the best layout for all works. It is up to the managing engineer so to design the plant that there is a minimum of idle capital. It must not be forgotten that lack of knowledge as to what individual sections are doing and what quantities of raw material are required may mean that a continued and perpetual waste is taking place which may far outweigh the extra cost of plant involved. In any case, a considerable amount of reserve plant and alternative flow path must be provided by all gas undertakings in order to be certain of keeping to their statutory obligations. Skill and foresight in the arrangement of such a standby plant can make the cost of sectionized measurement and testing a minimum. For example, two principles which can be followed with advantage are: (1) Avoid branches from one section to another unless there are means to isolate the sections if necessary; (2) have several comparatively small tanks or bunkers for holding material in preference to one large one supplying or leading from more than one section.

The provision of one or more spare, calibrated tanks which may be coupled up to any desired pipe is also a useful practice. All washers, condensers, meters, &c., on the works should be provided with by-pass connexions, and, where the number of values can be allowed, series and parallel flow should be possible. A very useful procedure is to install a few T connexions in pipes and mains so that a branch can readily be connected if, at some future date, it is desired to provide an alternative path for special test purposes. This is not an expensive

matter when making new erections, and may often avoid troublesome work later on. Since a considerable proportion of the cost is the price of extra main valves, economy may be effected by using simple water-sealed isolating valves consisting of a U-main or box containing a vertical dip-plate, which may be filled or emptied to allow for the shutting or opening of the main as required. Such water seals may, if desired, be made on the works, and have the advantage that they cannot pass gas when sealed. They can, however, only be worked fully open or fully closed, and cannot be used for regulation of flow rate. For many purposes this latter is no disadvantage.

Among the factors which ought to be known in order to control scientifically the manufacture of gas are the following; these relate to measurement of total and sectional quantities:

(1) *Make of Gas:* Although most large works run two or more station meters in parallel, it is not usual to meter separate streams of purified gas from, say, separate carbonizing units, on account of the prohibitive cost of duplicating the scrubbing and purifying plant which would be necessary for such a course. There are, however, certain comparatively low-priced inferential meters which may be installed on the separate crude gas streams. The accuracy of meters of this type working on crude gas should be frequently tested, and this can be done if arrangements can be made which render it possible to check against a meter of known accuracy running in series with it.

If the latter is working on purified gas, a connexion will have to be applied, usually of the order of 1%, to allow for the hydrogen sulphide and ammonia abstracted by the purifying plant.

It is not always necessary to have such meters on all the sections of plant. It may be sufficient to have one meter alone which can be coupled up to any desired unit as required.

(2) *Calorific Value and Analysis of Gas:* These may be tested by means of separate services run to sampling holders. Where it is necessary to take gas from the inlet side of the exhausts, a small exhauster will have to be installed to provide the necessary pressure for filling the sampling holders, &c. It may also be necessary to use miniature purification plant in cases where crude gas is being sampled. Sampling holders may be dispensed with if it is only desired to obtain a continuous record by means of a recording calorimeter.

(3) *Weight of Coal Used:* Where practicable, weighed trucks may be allocated to definite sections of the plant. In other cases automatic weighing machines can be used on the coal stream passing along conveyors.

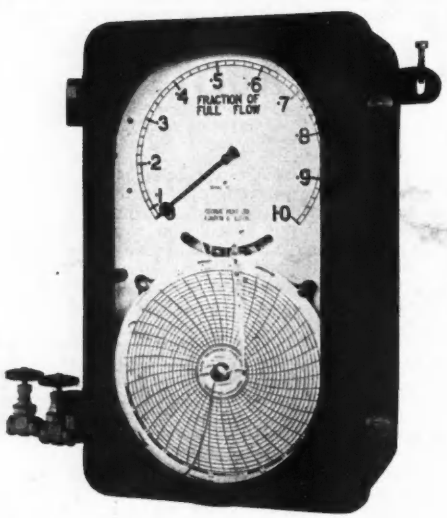
(4) *Weight of Coke Produced:* This is not usually an easy matter to determine, especially in the case of horizontals, where hot coke is used direct from retort to producer. Where all the coke is discharged into skips, these should be filled completely at each discharge, and the number discharged per section counted, the weight of a full skip having been previously determined. In other cases calibrated hoppers give a good approximate figure.

(5) *Tar and Liquor Produced:* These figures are not easily determined with any great accuracy. Where possible, the combined tar and liquor streams may be led to a settling tank, preferably a tall, comparatively narrow one, standing above ground. The mixed tar and liquor should be allowed to stand for a day or more in order to obtain a well-defined separating line. A measuring rod or weighted wire, preferably of slightly rusted iron, rubbed lightly over with paraffin, will show a good separation between the depth of the tar and supernatant liquor.

(6) *Water Used on Condensers, Washers, &c.:* Water meters are not always as reliable as could be desired, and a test on the water consumption of condensers, washers, &c., is most accurately carried out by employing an overhead calibrated tank. This tank may be used, when testing is not in progress, as a continuous source of supply, being fed *via* a floating ball valve. A useful reserve of water is thus always available in cases of shortage of supply. When testing, the ball-valve delivery can be shut off and the amount of water consumed read off by taking periodic dippings.

METERING GAS IN GRID SCHEMES

SOMEWHERE about midway between the Utopian idea of a single central gas-works supplying gas to the whole country through a great network of mains, and the old-fashioned system of small separately-controlled units in restricted areas, there is an ideal system of gas production and distribution which is still far from realization. Whether it will come ultimately through developments such as those visualized by Colonel W. M. Carr in his contribution to the Symposium at the June meeting of The Institution of Gas Engineers, or whether the urgent problem of providing against interruption of supply by air raids will hasten its accomplishment, is a matter for conjecture. The fact is that there are in this country to-day notable examples of "grids" arising from both sets of circumstances. Another

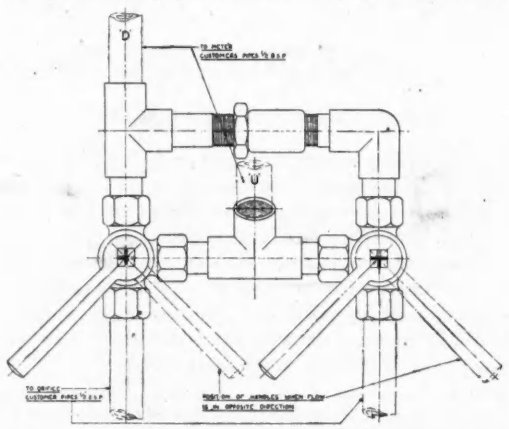


Ring Balance Meter with Disc Chart and Circular Scale as used in one of the Grid Schemes to indicate rate of flow and to record variations of flow and pressure on the same diagram.

truism, demonstrated by actual raid experience, is that the linking up of the supplies of neighbouring undertakings is the only practicable way of ensuring that a vulnerable area shall not be entirely deprived of its services in the event of the works sustaining a direct hit.

The West Yorkshire Gas Distribution Company's scheme is an interesting instance of grouping for normal peacetime purposes, and a northern county, quite independently, has more recently been responsible for an air-raid precautions "grid" development conceived solely for the purpose of ensuring for any one or more of a group of five undertakings an emergency supply of gas from neighbouring works. The north, of course, is not unique in its exploration of the potentialities of grouping, although both these schemes probably have features not met with in other parts of the country. A number of amalgamations elsewhere have led to the closing down of small local works and the supply of gas from a central station, and more undertakings were in process of being merged when war conditions temporarily suspended the actual work of linking up. Inter-connexions arising from air-raid emergencies have been made in several other areas, but these examples suffice to show the general idea, and both schemes are of especial interest from the point of view of the arrangements made for measuring the gas passing to and fro between the various producing and distributing points.

The West Yorkshire Gas Distribution Company, the first company of its kind authorized to buy gas from coke ovens and gas undertakings and distribute and sell only to gas undertakings connected to its system, is operating miles of high pressure mains ranging in size from 4 in. to



This simple reversing system has been installed to enable manual change-over in the event of the direction of the flow of gas being reversed.

18 in. The town gas made at a number of stations, together with coke oven gas purchased from neighbouring plants, is distributed according to the requirements of the individual undertakings, and the system operates with an initial maximum pressure of 35 lb. per sq.in.

At each of the supply stations a Ring Balance Recorder of the RTE/ID type, supplied by George Kent, Ltd., has been installed to indicate the rate of flow and to record variations of flow and pressure on the same diagram. There is also volumetric control at each of the receiving stations.

The A.R.P. scheme is one in which five northern gas undertakings, with a total annual pre-war output of about 1,735 million cu.ft. of gas, have linked up their supplies in the form of a network so that any works temporarily put out of action could take its supply of gas from any one or more of its neighbours. The metering arrangements for the A.R.P. scheme had to be based on the possibilities that, so long as there was no interruption in the functioning of the individual gas-works there would be no work for the instruments to do, and also

that at any moment the instruments might be called upon to measure gas passing in either direction. For example, if "East" works were bombed, there would be a flow of gas from west to east, and if "West" works went out of action, the gas would flow from east to west. If both "East" and "West" went up simultaneously, there would still be "North" and "South" and, let us say, "South-West." Each link in the chain is equipped with a Kent Ring Balance Recorder of the RTE/D type, each of which can measure the gas at from 1 to 20 in. pressure, according to the appropriate orifice fittings.

The whole range of these instruments, of which there are different types for recording only; recording and indicating; recording and counting; and recording, counting and indicating, are designed to measure, in conjunction with an orifice fitting, the flow of low pressure air or gas, and they are particularly immune to dust, heat, and vibration. The instrument consists of two closed chambers to which the differential pressure from the orifice plate is brought. These chambers are built in the form of a ring, and are carried by a frame pivoted on a knife edge and carrying the recording pen and the indicating pointer. While the working mechanism is the same, there are slight variations in pattern, the type employed in the A.R.P. scheme having a chart roll sufficiently long to last for 30 days, while that used in the West Yorkshire "grid" has a disc chart and a circular scale. There are two different types of orifice fittings. The purpose of the orifice fitting is to create the differential pressure which is transmitted through pressure pipes to the recorder and which is the basic operating power.

The possibility of the instrument being called upon to measure the flow of gas in either direction has been met by the installation of a simple reversing system. The change-over is made manually by switching over two small levers which operate valves on the pipes between the recorder and the orifice fitting. It would have been possible to fit ring balance recorders capable of measuring either way, but the effect would have been to restrict the arc of the pen travel by half, and the manual change-over was deemed to be in every way the better system.

EASTERN COUNTIES ASSOCIATION

A Topical Programme

ASTONISHINGLY well attended (bearing in mind the awkwardness of circumstances for the time being) was the Autumn Meeting of the Eastern Counties Gas Engineers' and Managers' Association which was held on Thursday of last week, Nov. 20, at Gas Industry House, Grosvenor Place, London, S.W., under the Presidency of Col. JOHN KENNINGTON, of Grimsby. The formal business included the election of officers; and afterwards, in private session, four Papers dealing with wartime problems were read and discussed.

The New Director of Gas Supply

The PRESIDENT, at the outset, offered, on behalf of the members and himself, congratulations to Dr. E. W. Smith on his appointment as Director of Gas Supply. This was a very big position, and he thought the right man had been chosen for the job. Dr. Smith was an associate member of the Association, and he felt sure he would have the united support of the members, and of the entire Gas Industry. ("Hear, hear.")

After the adoption of the minutes, and the notification by the Hon. Secretary (Mr. H. H. Redwood, of Newmarket) of apologies for absence, including one from Sir Frederick J. West, President of The Institution of Gas Engineers, it was announced by Col. Kennington that, since their last meeting, the Association had lost by death one of their oldest and most esteemed members—Mr. C. D. Banham, an honorary member, who joined them as long ago as 1895. The Secretary had written a letter of condolence, and a floral tribute was also forwarded on behalf of the Association. Mr. J. Green, of Wisbech, too, had just had the misfortune to lose his wife. As a mark of sympathy, those present stood in silence.

Officers for 1942

The following office-bearers for the coming year were next elected:

President: F. H. Robinson, Bishops Stortford.
Vice-President: L. C. B. Williams, Thetford.
New Committee Members: W. J. C. Garrard, Ipswich; G. B. L. Williams, King's Lynn; and J. Hunter Rioch, Cambridge.
District Representative on Institution Council: F. H. Robinson.
Secretary to Education Scheme and Salesmanship Course: R. Prince, Peterborough.
Secretary and Treasurer: H. H. Redwood, Newmarket.
Auditors: J. H. Troughton and C. H. R. Wimhurst.

Mr. ROBINSON, returning thanks for his election to the Chair, said he much regretted that prevailing circumstances would not permit of a two-day May meeting, but he did hope that some arrangement might be feasible whereby the members could visit his district, even if they could not hold a meeting there. His Company would gladly extend hospitality in any way that might be suitable, but arrangements must be left until a later date.

To be Borne in Mind

The PRESIDENT remarked that they were fortunate in the technical fare provided for the meeting. It had been felt by the Committee that some of the well-known gas engineering contracting firms would be in a position to give the members very valuable information in regard to repair problems occasioned by enemy action, and they had kindly undertaken to do so.

The following read Papers, which were discussed together, "in committee":

Mr. R. J. MILBOURNE, of Messrs. C. & W. Walker.
Mr. T. C. FINLAYSON, of the Woodall-Duckham Companies.
Mr. S. S. LANGFORD, of Messrs. Robert Dempster & Sons.
Mr. H. H. HOLLIS, of the Oxley Engineering Company.

The PRESIDENT said they were very often greatly indebted to gas engineering contracting firms, and they were particularly so that afternoon for the valuable Papers they had heard read.

Mr. J. HUNTER RIOCH (Cambridge), proposing a vote of thanks to the authors, remarked that the contracting firms were to be highly complimented upon the ingenuity with which they were tackling the various problems arising from enemy action. Each job was an individual one, and it was only after the damage had been assessed that the proper steps could be taken to make repairs. In his capacity as Regional Gas Engineering Adviser, he had addressed a number of contractors, and in every case he received a reply stating the willingness of the writers to do anything they possibly could for an undertaking receiving damage. The suggestion at that time was that undertakings so damaged should in the normal course of things get in contact with the contractors in the habit of doing that work for them, but he understood that if this particular contractor was not available at the moment information would be given regarding someone else who would do the job for the undertaking. While proposing this vote, there were one or two important points to which he would like to call the attention of members. In the first place, he would appeal to those with horizontal retorts to use as much Durham coal as they possibly could. There were certain undertakings in the region which, because of their type of plant, were not able to carbonize this coal. There was a Committee whose job it was to allocate coal to each undertaking, and unless this Committee received the cordial co-operation and support of engineers their work would not run smoothly. His next point was to urge all gas engineers to take care to review their equipment, so that in an emergency it might not be found wanting. Probably, if they looked into the matter thoroughly, they would find there was a good deal of additional equipment they could do with. The third point was in connexion with possible billeting requirements. He suggested that it should be made a part-time job for one of the clerical staff to make enquiries and get into touch with people who would be willing to house contractors' workmen should it be necessary to draft them into the town to attend to emergency repairs. This might make all the difference to the job being promptly and satisfactorily completed.

Mr. C. B. STANIFORTH (Ely) seconded the vote, which was carried with applause.

Cordial acknowledgment of the services of the President concluded the proceedings.

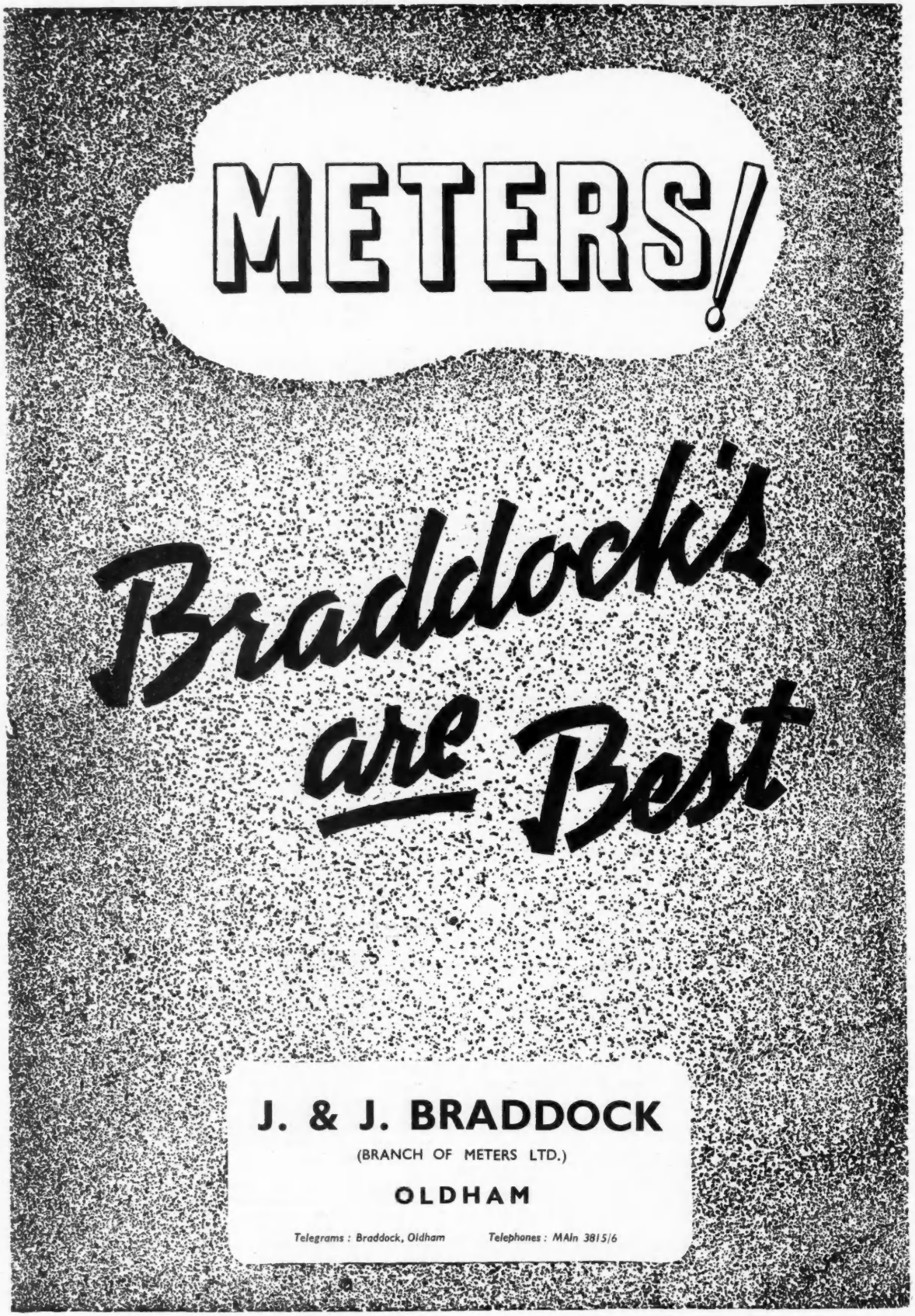
The Following Meetings of the Gas Research Board have been provisionally arranged to take place in December:

Tuesday, Dec. 2, 11 a.m., Membership Committee, 12 noon Finance Committee, 2 p.m. Council; Thursday, Dec. 11, 2 p.m. Refractory Materials Joints Committee; Friday, Dec. 12, 2 p.m. Joint Research Committee.

The Following Meetings of The Institution of Gas Engineers have been provisionally arranged to take place before the end of the year:

Thursday, Nov. 27, 2.45 p.m., Domestic Heating Committee; Monday, Dec. 8, 1.30 p.m., Finance Committee, 2 p.m., Membership Committee; Tuesday, Dec. 9, 9.30 a.m., General Purposes Committee, 10.30 a.m. Council; Friday, Dec. 12, 12.15 p.m., Liquor Effluents and Ammonia Committee; Tuesday, Dec. 16, 2 p.m., Gas Education Executive Committee.

Recognition for Five Consecutive Years of accident-free driving was made to eight employees of the Cambridge University and Town Gas Light Company on Nov. 14. These consisted of Silver Medals awarded by the Royal Society for the Prevention of Accidents for five consecutive years of safe driving. The Chairman of the Company (Mr. J. F. Cameron, M.A.) in making the presentations congratulated the men on their steadiness and consistency and the valuable contribution they were making towards the reduction of accidents. The following received Silver Medals: T. Impey, F. Chapman, P. Prior, S. Gullick, F. Brown, A. Stubbings, P. Papworth, and C. Johnson, who is serving with H.M. Forces. One driver, Mr. Edward Johnson, would have received a medal had he not been called up for National Service during the year.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GAS AND THE INTERNAL COMBUSTION ENGINE.*

By D. C. GUNN, B.Sc.

IN the earlier days of gas engines it was considered desirable to use slow speeds and moderate mean effective pressures by reason of low maintenance. To-day, with the improved materials available, high speed, high mean effective pressure engines are being developed with promise of greatly improved results over the older type. The internal combustion engine has developed from the gas engine, becoming successively the petrol engine and the diesel engine. These later developments are now in their turn influencing the design of the parent gas engine. Let us see therefore what influences are at work, what some of the difficulties are, and examine one or two possibilities.

The internal combustion engine benefits from a high compression ratio and of recent years several new designs have been introduced. The ordinary compression ignition diesel was modified so that gas along with air was inspirated into the cylinder, compressed and ignited by means of an injection of fuel oil representing about 5% to 10% of the maximum fuel requirements of the engine. Efficiencies of a very high order were obtained although much seemed to depend upon the combustion chamber design. Trouble with detonation has occurred in some designs, and it is thought that this is due to the explosion of pockets of mixture prior to the firing of the main charge. The main charge is then detonated by the compression wave set up, with a result that there is rough running accompanied by loss of power.

Some designs of diesel made deliberate use of a swirl chamber to spread ignition, and it is largely in this classification that trouble is likely to be experienced. On the other hand, some authorities claim that almost any diesel can be successfully operated on oil and gas. Whether detonation will or will not occur will again depend on the properties of the igniting fuel, immediate combustion following injection being the ideal to be aimed at. Lengthy delay periods will permit the formation of explosive pockets with consequent detonation of the whole charge. However, should the claims for this type of engine be substantiated under working conditions (figures of approximately 35% thermal efficiency are said to have been obtained on test), the interesting fact remains that apart from the Still engine the gas-diesel may become the most efficient heat engine in existence.

Much has been heard of the Erren engine—once again a gas-diesel, but one in which the gas is injected during the compression stroke at considerable pressure. A rotating valve is used to control gas admission, air being introduced at the normal stage of the cycle through a normal inlet valve. The result is that the engine takes in some 25% more air than if gas and air were induced together. If sufficient gas is injected to burn the air completely, it is clear that the power output of the engine will have been increased in proportion to the increase in the amount of fuel supplied. The Erren engine has been built and run, but the rotary valve appears to be a difficulty. It is worthy of note that in the automobile industry rotary and sleeve valves have, after due trial, given place to the poppet valve. The Nordberg engine in America requires a similar arrangement, but the rotary valve is dispensed with and fuel oil and gas are injected together at a pressure of 1,000 lb./sq. in.

The Erren is in effect a supercharged engine (*i.e.*, the charge in the cylinder is greater than it would be if ordinary induction under atmospheric pressure had been allowed). The "effective" compression ratio is therefore increased, since the swept volume and clearance volume of the engine, although being dimensionally unaltered, now contain a greater volume of mixture at a higher initial pressure. Supercharging in any form, while increasing the power output, does not necessarily increase the thermal efficiency of the engine, since power is absorbed by the supercharger. If, however, with an Erren engine, gas is available at a sufficiently high pressure, the reduction does not take place, and hence in all probability the Erren engine is more efficient than the straightforward gas-diesel.

There is available the Buchi supercharge which utilizes the energy of the exhaust gases to drive a fan type supercharge. In this manner no power is absorbed from the engine in driving the blower, although there may be a slight increase in back pressure in the exhaust system.

The next question is, "Why use oil for ignition?" Why not completely dispense with the dual fuel in favour of gas with electric ignition—in other words, come back to a gas engine with a high compression ratio. This has been accomplished with a striking degree of success by the National Company, which produces a high compression gas engine which is really a standard diesel with a spark plug substituted for a fuel oil injector. The problem is not so simple as it sounds, however, since various difficulties enter into the field. First, the di-electric strength of a gas air mixture is greater than that of a petrol air mixture. Therefore for a given sized spark-gap a greater voltage is required across it. Hence for a spark to pass we must either increase the voltage or reduce the gap. If we reduce the gap we reduce the intensity of the spark, which reacts unfavourably upon the rate of combustion in the cylinder. If we increase the voltage we may reach a point where the spark will prefer to jump the electrodes outside the cylinder instead of inside it, with resultant misfiring. Unfortunately the higher we take the compression ratio the more aggravated this effect becomes, so we are faced with having to provide a specially insulated plug and high voltage equipment.

Secondly, spark plugs have been designed primarily for petrol fuel which has a latent heat of evaporation. Petrol will enter the cylinder of an engine not fully vaporized and in evaporating will cool the inner parts of the cylinder, including the sparking plug. Gas has no such latent heat and hence it cannot exercise this cooling power. Plugs may therefore overheat, with resultant pre-ignition, overheating of the engine, and loss of power. Hence it now becomes necessary to pay particular attention to the cooling of the plug as well as to its insulation.

A rather novel engine has been developed lately which overcomes those difficulties. This is the Aspin engine, in which the cylinder head contains a liner which in rotating acts both as a sleeve valve and plug shield, since it exposes the plug only when ignition is required, thus protecting it from direct radiation from the flame.

So now we have two types of high compression gas engine, oil ignited and electric ignited. Which is the better? The battle is still in progress, and while the indications are that the oil-diesel is the more efficient thermally at full load, the simplicity of electric ignition has its appeal. The fact does remain, however, that with one type or the other extremely high efficiencies can be obtained. It should also be remembered that with the diesel there is no loss of power compared with the original diesel operation.

There is a further important reason why electric ignition is prefereable to oil ignition—namely, the comparatively poor part-load efficiency of the latter. It will be realized that in most machines the efficiency increases to a maximum at maximum load, and the internal combustion engine is no exception to the rule. The gas diesel has a very unfortunate dropping-off in efficiency at low loads, and the reason for this is closely connected with the method of regulating the power output of the engine.

Naturally, the higher the temperature attainable by the mixture prior to ignition the more effective will that ignition become. Conversely, the lower the temperature the less effective the ignition becomes, until a point is reached when ignition is only partial and may even fail completely. Partial ignition obviously means poor efficiency. Now the gas laws state that pressure and temperature are interdependent, and therefore we can apply the above argument, substituting the word "pressure" for "temperature," and the statement then becomes, "the lower the pressure the less effective the ignition."

Now if we allow the piston to induce unimpeded a full volume, V, of air at atmospheric pressure during the induction stroke, that volume at the end of compression becomes v. If, however, the supply of air is restricted during induction, while full volume V will be present it will be at a pressure less than atmospheric, an amount dependent on the extent of the throttling. Hence, since we start off at a lower pressure than before, the final pressure is less and consequently the final temperature is less, and so we have a condition which may give rise to poor combustion. It is common practice to govern or control the output of an engine by opening or closing a throttle valve in the air or mixture intake, and it is due to this fact that the part-load efficiency of the gas diesel is small.

With electric ignition, however, combustion is started by an external means and is definite ; hence the tendency for incomplete combustion does not occur. With the straight diesel output regulation takes place by varying the quantity of oil injected and letting the engine take in a full change of air. By this means the full temperature prior to ignition is attained, and combustion is definite in spite of the fact that excess air is present. This is the reason for hit and miss governing employed largely on gas engines a decade or so ago. The part load efficiency is much better than with throttle governing.

The question "oil or electric" ignition then is linked up with the type of governing used. If a modern equivalent of hit and miss governing can be developed the oil ignition system may offer the advantage of a better overall efficiency, in view of the fact that the full load efficiency is greater than with electric ignition. If, when the governor takes control, complete shut-off of gas can be arranged while full air admission is permitted, the condition of "hit and miss" governing would be obtained.

Having developed a super-efficient gas engine, to what practical purposes can it be applied? The stationary diesel is still preferred to electrical drive for many industrial applications, and provided gas price is competitive there is no reason why the gas diesel should not replace it. But there are other sides to the question, one of which is transport.

Turning to commercial road transport, it will be appreciated that in spite of the fact that high pressure gas stored in cylinders has met with a certain amount of success, there are one or two serious drawbacks associated with its use. When one comes to consider that the weight of the vehicle is increased by approximately 100 lb. per gallon of liquid fuel storage it is obvious that there is going to be a serious loss of payload. Also it seems certain that 100 miles per filling of gas is a little inconvenient for both passenger and goods transport. It must here be stressed that it is the gas diesel that has the advantage on account of its greater fuel economy. It might well be that future development of transport will be connected with the liquefaction of components of town gas, such as methane, and not with the direct use of compressed gas, the gas being stored in liquid form in heat-insulated containers on the vehicle.

* From a Paper to the Yorkshire Junior Gas Association, Nov. 1.

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Gas Products Prices

The London Market

Nov. 24.

Current prices of Coal Tar Products in the London market are about as under:

Pitch nominal; creosote 5d. to 5¼d.; refined tar 4d. to 4¼d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d., and 90/160 pyridine 13s. 6d.; all per gallon naked *ex* Makers' Works. By the Direction issued under the Control of Coal Tar Order, 1941, maximum prices have been fixed for all grades of Naphthalene. The maximum price for refined crystal naphthalene in 2-cwt. bags and in 4-ton lots is £23 per ton delivered.

The Provinces

Nov. 24.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¼d. to 4½d.; Scotland, 4¼d. to 4½d.; low gravity, 4¼d. to 4½d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10.

Tar Products in Scotland

GLASGOW, Nov. 22.

Trading conditions are gradually becoming more normal and prices generally continue strong.

Refined tar: A quietly steady throughput is maintained at 4¾d. to 5d. per gallon for home trade and about 4d. per gallon for export, both f.o.r. naked.

Creosote oil: All grades are in good call. Specification oil, 5¾d. to 6d. per gallon; low gravity, 6¼d. to 7d. per gallon; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk.

Cresylic acid: Various restrictions have an adverse effect on normal trading. Prices are purely nominal as follows: Pale, 99/100%, 4s. 4d. to 4s. 8d. per gallon; Pale, 97/99%, 4s. to 4s. 3d. per gallon; Dark, 97/99%, 3s. 9d. to 4s. per gallon; all *ex* Works in buyers' packages.

Crude naphtha is changing hands at 6½d. to 7¼d. per gallon *ex* Works in bulk, according to quality.

Solvent Naphtha: 90/160 grade is 1s. 8½d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5½d. per gallon.

Pyridines are dull with 90/160 grade valued at round 14s. per gallon and 90/140 grade at round 16s. per gallon.

Buckhaven and Leven Gas Commissioners have decided to reduce the price of gas by 3d. per 1,000 cu.ft., bringing the price to 3s. 6d. per 1,000 cu.ft. Three months ago a reduction of 2d. per 1,000 cu.ft. was made.

Gas Stocks and Shares

Stock Markets opened under the cloud of uncertainty regarding the industrial situation in America, although the tone was steady. Later, however, business improved, and after the news from Libya things became quite lively. There was little demand for gilt-edged as the bulk of the activity centred round the speculative sections, but prices held steady. Home rails were in demand at the close. Practically all groups in the industrial market were strong and, supplies being short, prices rose, and although some profit-taking caused a few reactions, the majority closed at their former higher levels. The U.S.-Mexican Agreement gave a fillip to oil shares, but the best prices were not fully held.

The volume of business in the Gas Market was about on a level with that of the previous week and, with the exception of the rise of 6d. in Gas Light units, quotations closed without change. Apart from a few of the leading ordinaries there is very little stock available, and investors requiring any of the fixed-interest variety will doubtless have to add their names to a long waiting list.

The announcement that the Treasury had lifted the ban on the optional conversion of public utility issues bearing interest at over 4% will doubtless be of interest to those Companies concerned, although there does not appear to be a great amount of gas stock in this category due for redemption in the near future.

The following price changes took place during the week:

OFFICIAL LIST

Gas Light Units	12/9—13/9	+-/6d.	
United Kingdom 4½ p.c. 1st Cum. Pref. (x.d.)	14/—16/-	Nov. 17	
Ditto 4 p.c. 1st Red. Cum. Pref. (x.d.)	14/6—16/6	,,	

SUPPLEMENTARY LIST

Gas Consolidation "A" Ord. (x.d.)	11/6—13/6	Nov. 17

PROVINCIAL EXCHANGES

Newcastle Units	17/9—18/6	--/3d.

METRO
TRADE MARK

IN normal circumstances this space is occupied by information concerning the many Coal Tar and Ammonia Chemicals produced by the South Metropolitan Gas Company.

MANY of these products, required in the last war, are wanted more than ever to-day for war purposes.

CERTAIN "Metro" products, however, are available for normal business, such as Medium Soft Coal Tar Pitch, Creosote Oils, Dry Neutral Sulphate of Ammonia, etc., and enquiries for these should be directed to the manufacturers:—

SOUTH METROPOLITAN GAS COMPANY
Products Department:
REGIS HOUSE,
KING WILLIAM STREET,
E.C.4.
Telephone: AVENUE 2755.

En passant

Virtue is bold and goodness
never fearful.

Shakespeare (Measure for Measure).

Illustration shows A. & M. Dry Test Meter. These are made in 40, 100 and 200 c.ft. sizes. The pointer shows the hourly rate by a minute's observation on the outer circle and 1 c.ft. in 100th parts on the inner.

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